Having thus defined the invention, the following claimed:

1. An electric arc welder with a waveform generator controlled to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of current pulse waveforms each having a starting time, a current ramp up portion with a set first lapsed time, a peak current portion with peak current and a second lapsed time, a current ramp down portion with a third lapsed time and a background current portion with a background current and a fourth lapsed time, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece and a circuit to reset said waveform generator to said starting time upon sensing a short circuit.

2. An electric arc welder as defined in claim 1 wherein said voltage sensing circuit is activated only after said second lapsed time.

3. An electric arc welder as defined in claim 1 wherein said voltage sensing circuit is activated only during said background current portion.

4. An electric arc welder as defined in claim 1 including a short clearing circuit for increasing said current flow outside said pulse waveform upon sensing of a short before said second lapsed time.

5. An electric arc welder as defined in claim 4 wherein said electrode is a solid wire with an outer shielding gas.

6. An electric arc welder as defined in claim 3 wherein said electrode is a solid wire with an outer shielding gas.

7. An electric arc welder as defined in claim 2 wherein said electrode is a solid wire with an outer shielding gas.

8. An electric arc welder as defined in claim 1 wherein said electrode is a solid wire with an outer shielding gas.

9. An electric arc welder with a waveform generator controlled to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of current pulse waveforms each having a current ramp up portion, a peak current portion, a current ramp down portion and a background current portion, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece and a circuit to reset said waveform generator to restart said pulse waveform upon sensing a short circuit.

10. An electric arc welder as defined in claim 9 wherein said voltage sensing circuit is activated only after said peak current portion.

11. An electric arc welder as defined in claim 9 wherein aid voltage sensing circuit is activated only during said background current portion.

12. An electric arc welder as defined in claim 9 including a short clearing circuit for increasing said current flow outside said pulse waveform upon sensing of a short circuit after said current ramp up portion and before said current ramp down portion.

13. An electric arc welder as defined in claim 12 wherein said electrode is a solid wire with an outer shielding gas.

14. An electric arc welder as defined in claim 11 wherein said electrode is a solid wire with an outer shielding gas.

15. An electric arc welder as defined in claim 10 wherein said electrode is a solid wire with an outer shielding gas.

16. An electric arc welder as defined in claim 9 wherein said electrode is a solid wire with an outer shielding gas.

17. A method of electric arc welding with a waveform generator controlled to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of current pulse waveforms each having a current ramp up portion, a peak current portion, a current ramp down portion and a background current portion, said method comprising:

(a) sensing a short circuit between said electrode and said workpiece; and,

(b) resetting said waveform generator to start a next waveform upon sensing a short circuit.

18. The method as defined in claim 17 wherein said resetting act is possible only after said peak current portion.

19. The method as defined in claim 17 wherein said resetting act is possible only during said background current portion.

20. A method as defined in claim 17 including the additional act of:

(c) clearing a short circuit by increasing said current flow outside said pulse waveform upon sensing of a short circuit after said current ramp up portion and before said current ramp down portion.

21. The method as defined in claim 20 wherein said electrode is a solid wire with an outer shielding gas.

22. The method as defined in claim 19 wherein said electrode is a solid wire with an outer shielding gas.

23. The method as defined in claim 18 wherein said electrode is a solid wire with an outer shielding gas.

24. The method as defined in claim 17 wherein said electrode is a solid wire with an outer shielding gas.

25. An electric arc welder with a waveform generator controlled to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of pulse waveforms each having a current ramp up portion, a peak current portion, a current ramp down portion and a background current portion, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece and a reset circuit to reset said waveform generator upon sensing of a short circuit.

26. An electric arc welder as defined in claim 25 wherein said reset circuit is operable only after said peak current portion of said waveform.

27. An electric arc welder as defined in claim 26 including a short clearing circuit for cleaning a sustained short circuit by increasing said current flow outside said waveform during said peak portion of said waveform.

28. An electric arc welder as defined in claim 27 wherein said electrode is a solid wire with an outer shielding gas.

29. An electric arc welder as defined in claim 26 wherein said electrode is a solid wire with an outer shielding gas.

30. An electric arc welder as defined in claim 25 wherein said electrode is a solid wire with an outer shielding gas.

31. A method of electric arc welding with a waveform generator controlled to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of pulse waveforms each having a current ramp portion, a peak current portion, a current ramp down portion and a background current portion, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece, said method comprising:

(a) detecting any short circuit between said electrode and said workpiece; and,

(b) resetting said waveform generator upon sensing of a short circuit to immediately start a new next waveform after a sensed short circuit.

32. A method as defined in claim 31 wherein said resetting act is operable only after said peak current portion of said waveform.

33. A method as defined in claim 31 including the additional act of:

(c) increasing said current flow outside said waveform during said peak portion of said new next waveform, when there is a sustained short circuit at the start of new next waveform.

34. The method as defined in claim 33 wherein said electrode is a solid wire with an outer shielding gas.

35. The method as defined in claim 32 wherein said electrode is a solid wire with an outer shielding gas.

36. The method as defined in claim 31 wherein said electrode is a solid wire with an outer shielding gas.

37. An electric arc welder with a program to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of pulse waveforms each having a starting time, a peak portion with a peak parameter, and a background portion with a background parameter, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece and a circuit to reset said program to said starting time of the next waveform upon sensing a short circuit.

38. An electric arc welder as defined in claim 37 wherein said voltage sensing circuit is activated only during said background current portion.

39. An electric arc welder as defined in claim 37 including a short clearing circuit for increasing said current flow outside said pulse waveform upon sensing of a short before said background current portion.

40. An electric arc welder as defined in claim 39 wherein said electrode is a solid wire with an outer shielding gas.

41. An electric arc welder as defined in claim 38 wherein said solid wire is a metal cored wire.

42. An electric arc welder as defined in claim 37 wherein said electrode is a solid wire with an outer shielding gas.

43. An electric arc welder as defined in claim 42 wherein said parameter is selected from the class consisting of current, voltage, power and energy.

44. An electric arc welder with a program to create a welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of current pulse waveforms each having a peak current portion and a background current portion, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece and a circuit to reset said waveform to restart said pulse waveform upon sensing a short circuit.

45. An electric arc welder as defined in claim 44 wherein said voltage sensing circuit is activated only after said peak current portion.

46. An electric arc welder as defined in claim 44 wherein said voltage sensing circuit is activated only during said background current portion.

47. An electric arc welder as defined in claim 44 including a short clearing circuit for increasing said current flow outside said pulse waveform upon sensing of a short circuit before said background portion.

48. An electric arc welder as defined in claim 44 wherein said electrode is a solid wire with an outer shielding gas.

49. A method of electric arc welding with a pulsed spray welding process involving current flow between an electrode and a workpiece, said welding process comprising a succession of pulse waveforms each having a peak portion, a background portion, said method comprising:

(a) sensing a short circuit between said electrode and said workpiece; and,

(b) starting a next waveform upon a short circuit.

50. The method as defined in claim 49 wherein said starting act is possible only during said background portion.

51. A method as defined in claim 49 including the additional act of:

(c) clearing a short circuit by increasing said current flow outside said pulse waveform upon sensing of a short circuit during said peak portion.

52. The method as defined in claim 49 wherein said electrode is a solid wire with an outer shielding gas.

53. An electric arc welder to create a pulsed spray welding process involving current flow between an electrode and workpiece, said welding process comprising a succession of pulse waveforms, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece and a reset circuit to start a new waveform upon sensing of a short circuit.

54. A method of electric arc welding by creating a pulsed spray welding process involving a succession of pulse waveforms, a voltage sensing circuit to sense a short circuit between said electrode and said workpiece, said method comprising:

(a) detecting any short circuit between said electrode and said workpiece; and,

(b) immediately starting a new next waveform after a sensed short circuit.

55. The method as defined in claim 54 wherein said electrode is a solid wire with an outer shielding gas.